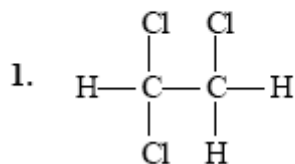


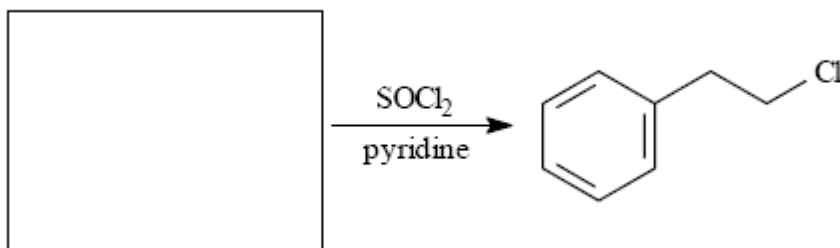
Give a IUPAC name for each of the following alkyl halides.



For the following problems, draw structures corresponding to the given names.

5. 3-iodoprop-1-ene

For the following problems, provide structures for the reactants, intermediates, or products, as indicated. Draw the structures in the boxes provided.

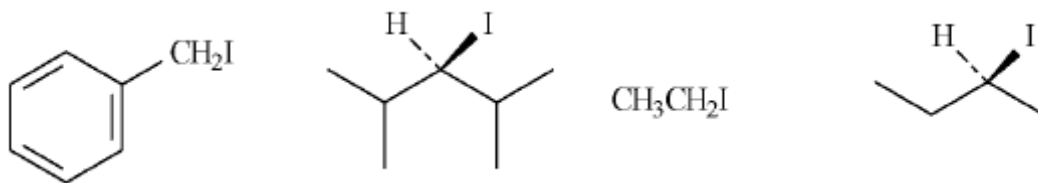


(7)

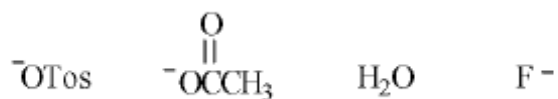
**Circle** the correct response in each set below.

The *least* reactive compound in an  $S_N2$  reaction.

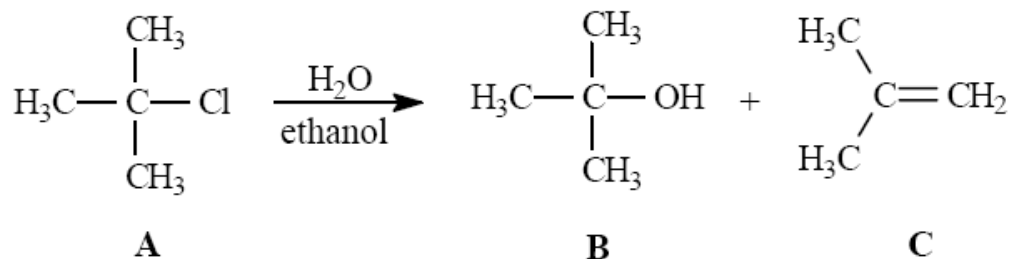
(9)



10. The *best* leaving group in an elimination reaction.



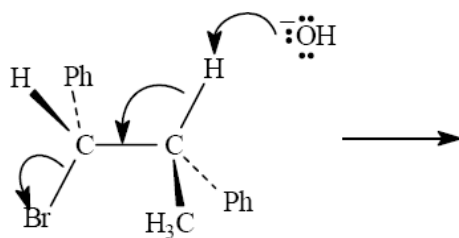
Consider the reaction below to answer the following questions:



22. Compound B is the:

- $\text{S}_{\text{N}}2$  product
- $\text{S}_{\text{N}}1$  product
- E2 product
- E1 product

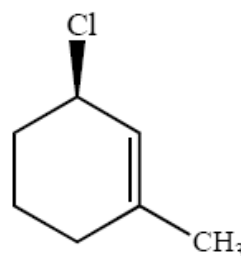
Consider the reaction below to answer the following questions:



25. Write the product that results from the indicated electron flow in the reaction, showing any resulting stereochemistry
28. Which of the following is the best leaving group for nucleophilic substitution?
- OH
  - I
  - Br
  - Cl
  - F
31. Which conditions favor an efficient (fast, high yield)  $\text{S}_{\text{N}}2$  reaction between an appropriate alkyl halide and a nucleophile with a charge?
- high concentration of a strong nucleophile, polar protic solvent
  - high concentration of a weak nucleophile, nonpolar solvent
  - low concentration of a strong nucleophile, polar aprotic solvent
  - low concentration of a weak nucleophile, nonpolar solvent
  - high concentration of a strong nucleophile, polar aprotic solvent

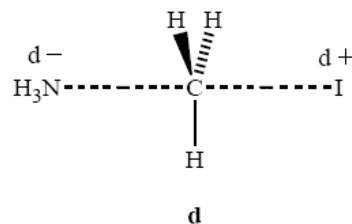
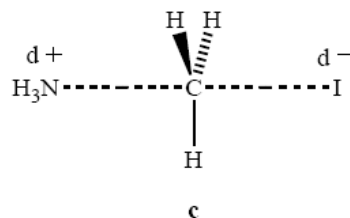
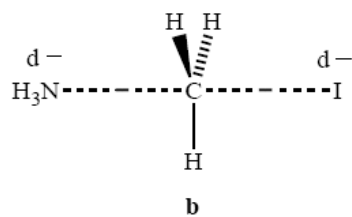
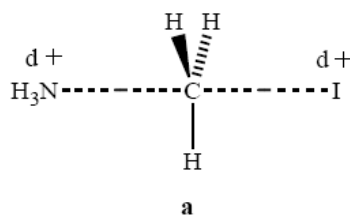
36. Which mechanism is favored by the reaction of a tertiary alkyl chloride with ethanol?
- $S_N1$
  - $S_N2$
  - E1
  - $E1_{CB}$
  - E2

41. What is the IUPAC name of the following compound?



- (*R*)-1-chloro-3-methyl-2-cyclohexene
- (*S*)-1-chloro-3-methyl-2-cyclohexene
- (*R*)-3-chloro-1-methylcyclohexene
- (*S*)-3-chloro-1-methylcyclohexene

43. Which of the following represents the transition state of the  $S_N2$  reaction between methyl iodide and ammonia?

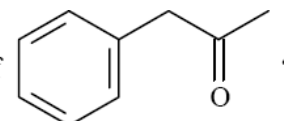


## Chapter 11 – Structure Determination: Mass Spectrometry, Infrared Spectroscopy, and Ultraviolet Spectroscopy

Select the most reasonable formula for the compounds with the following mass spectral data:

- $M^+$  at  $m/z = 101$ 
  - $C_5H_6Br$
  - $C_5H_{12}N_2$
  - $C_6H_{15}N$
  - $C_9H_{12}O$

- What are the masses of the charged fragments produced by alpha cleavage of



- Which of the following does *not* involve the interaction of molecules with electromagnetic energy?
  - mass spectrometry
  - infrared spectroscopy
  - ultraviolet spectroscopy
  - nuclear magnetic resonance spectroscopy

Match each of the following groups of bond-types to the region of the infrared spectrum in which their absorptions occur. Place the letter of the region in the blank to the left of the bond-type.

- 4000 to 2500  $cm^{-1}$
- 2500 to 2000  $cm^{-1}$
- 2000 to 1500  $cm^{-1}$
- below 1500  $cm^{-1}$

- \_\_\_\_ C–C, C–O, C–N, and C–X single-bond vibrations.

- \_\_\_\_ C=O, C=N, and C=C bond absorptions.

18. Cyclohexene and hex-2-yne both have the molecular formula  $C_6H_{10}$ . How would you use infrared spectroscopy to distinguish between the two compounds?

